United States Department of Agriculture
Bureau of Entomology and Plant Quarantine

A SIMPLE METHOD OF TESTING CAMERA SHUTTER SPEEDS FOR BETWEEN-THE-LENS SHUTTERS

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Incorrect ratings of shutter speeds are frequently sources of trouble in photographing insects, and a means used by the writer to determine actual speeds may be of interest to field workers. Although the following method is not entirely new, it is a comparatively economical and simple method of testing the slower speeds (1/100 second and under) for camera shutters mounted between the lenses (not the focal plane type).

This method utilizes the alternation at regular intervals of the light in a neon glow lamp as a measure of the timing of the shutter. This lamp has two semicircular plates which, when operated on a 110-volt, alternating, 60-cycle current, alternately interrupt the current so that the glow of each plate actually goes on and off 60 times each second, or the two plates a total of 120 times per second. The neon lamp used is the 2-watt size, standard base, and retails for about 50 cents. (A similar argon lamp may be used in place of the neon lamp and exposures made with a fast lens directly upon a fast bromide paper rather than on film.)

The neon lamp was mounted in a standard porcelain socket near the lower end of the pendulum and set so that the gap between the plates was in a horizontal position. Figure 1 shows a drawing of the pendulum, which was made of 1- by 2-inch pine wood and painted a flat black. The size of the pendulum is not important, and the particular one detailed in figure 1 was made of sufficient size to be swung from screw eyes fastened to the ceiling.

The camera was focused upon the lamp from about 4 or 5 feet distant, depending upon the focal length of the lens. By using the rising-falling front several exposures were made on the same film. Supersensitive panchromatic cut film was used, and the lens was opened wide. The pendulum was set in motion, and the exposures were made, preferably while the bulb was near the bottom of the arc. Negatives were developed in X-ray film developer for contrast.

Figures 2 and 3 show some prints of exposures with two shutters set for various speeds. The difference in appearance or distance between the lamp flashes is due to the various rates at which the pendulum was swinging. Each print is marked with a code letter designating the shutter, and the fraction denotes the speed at which the shutter was set for the test. In calculating the actual speed of the shutter found by the exposure test, it was merely necessary to count the total number of flashes, both the upper and lower semicircles, in the exposures and divide the average number of flashes into 120. For example, in the print in figure 2 marked B 1/10, 44 flashes are shown for the middle exposure and 120 divided by 44 equals approximately 3. The shutter B has therefore an actual speed of 1/3 second when set for 1/10 second.

The following table shows the actual shutter speeds as revealed by the tests photographed in figures 2 and 3:

Shutter (Code letter)	Supposed shutter speed (Seconds)	Average flashes for the interval	Actual shutter speed (Seconds)
B	1/50	3.2	1/37.5
B	1/25	13.0	1/ 9.2
B	1/10	44.0	1/ 2.7
V	1/50	7.0	1/17.1
V	1/25	16.7	1/ 7.2
V	1/100	1.7	1/70.6

The above method for testing shutter speeds may be easily modified to fit special cases, but the general method here outlined gives quite accurate results for all practical purposes.

Explanation of Illustrations

Figure 1.--Diagram of the apparatus used for testing the speed of between-the-lens shutters.

Figure 2.--Photographs of the winging neon bulb, showing the flashes of light emitted during the interval of exposure with shutter B set for various rated speeds.

Figure 3.--Photographs of the swinging neon bulb, showing the flashes of light emitted during the interval of exposure with shutter V set for various rated speeds.

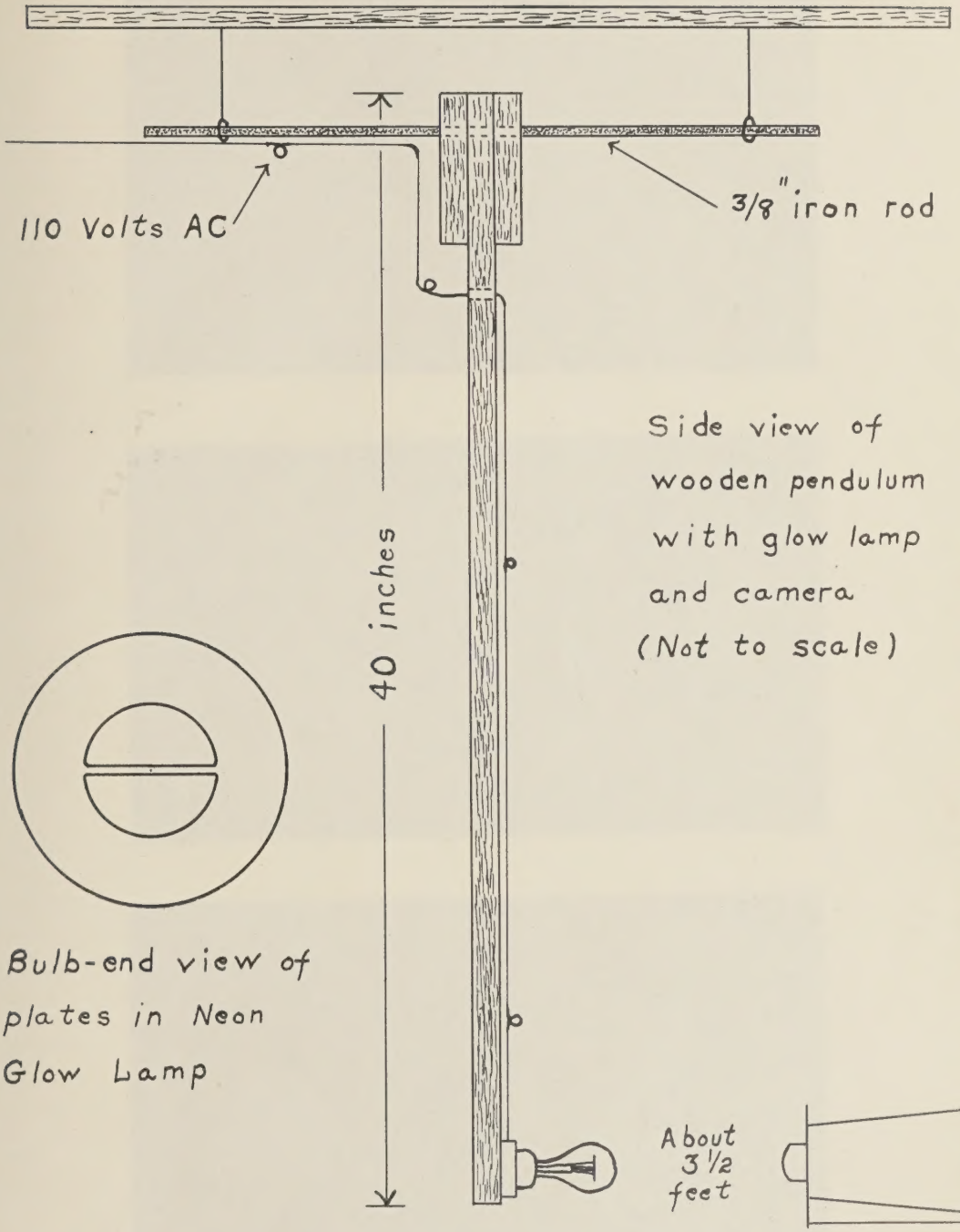
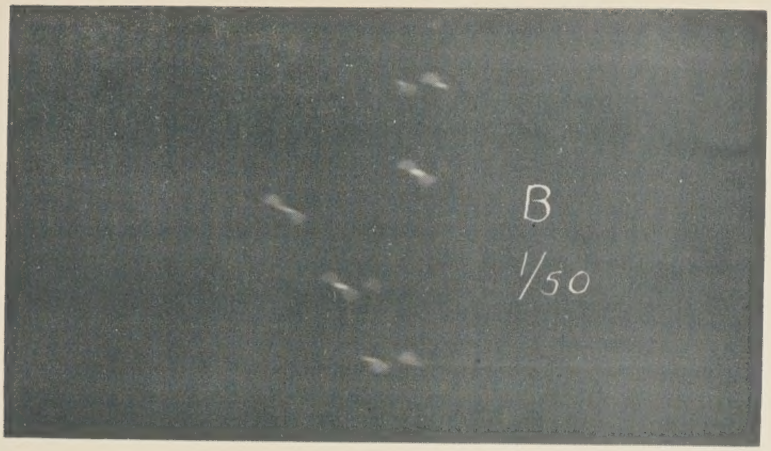
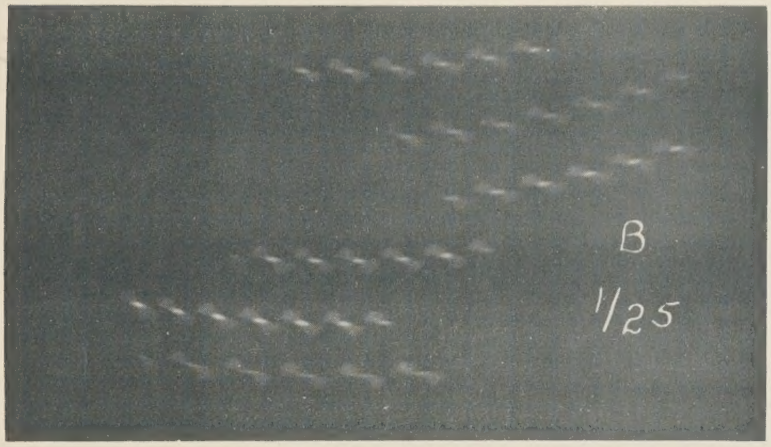

110 Volts AC
3/8" iron rod
40 inches
Side view of wooden pendulum with glow lamp and camera (Not to scale)
Bulb-end view of plates in Neon Glow Lamp
About 3 1/2 feet
Camera (not to scale)

Fig. 1





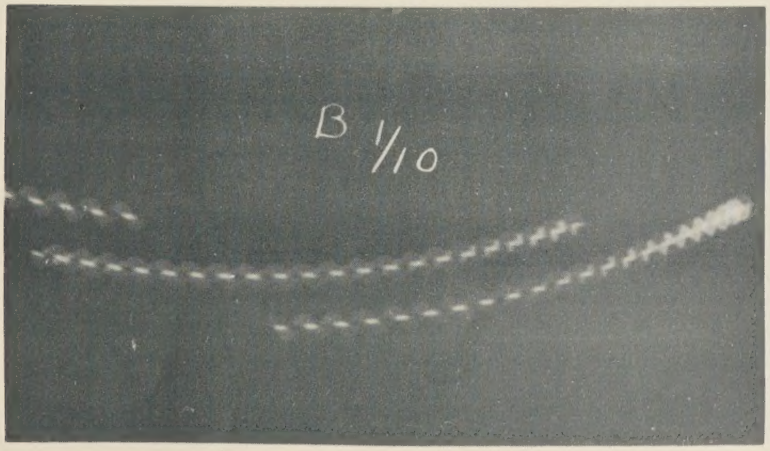
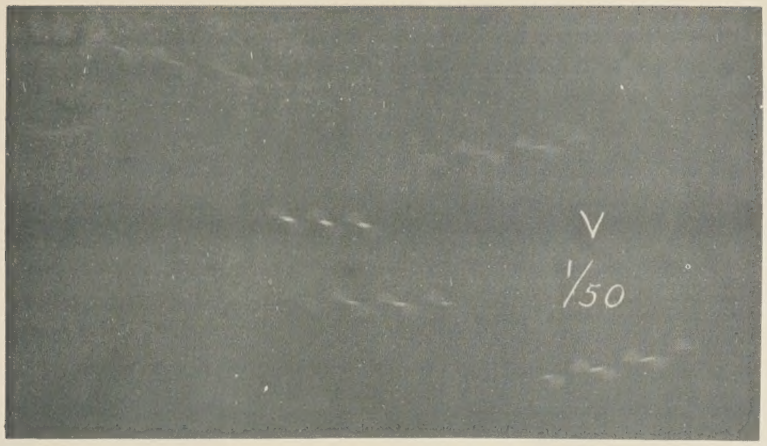
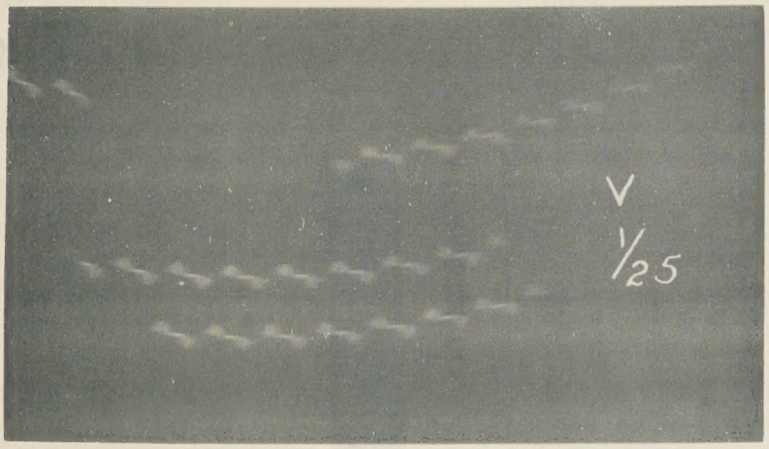


Figure 2





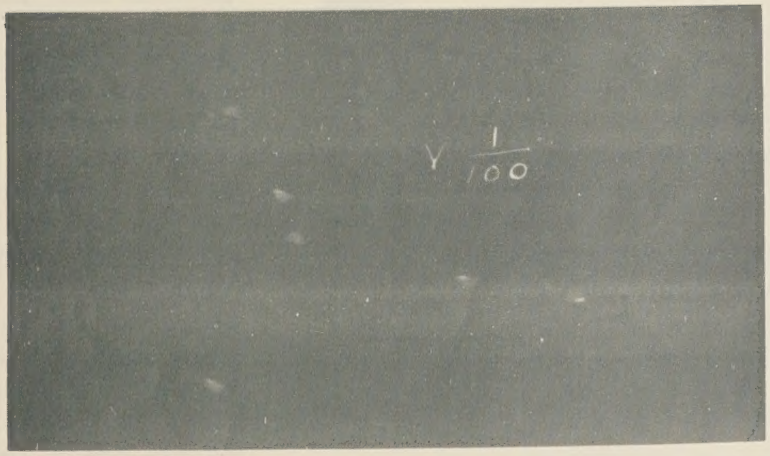


Figure 3